MONTANA
POLICY REVIEW

Public Safety Communications Interoperability and Federal Partnerships

By Chris Lewis

Department of the Interior Mission

The Department of the Interior (DOI) is the nation's principal conservation agency. Our mission is to protect America's treasures for future generations, provide access to our nation's natural and cultural heritage, offer recreation opportunities, honor our trust responsibilities to American Indians and Alaska Natives and our responsibilities to island communities, conduct scientific research, provide wise stewardship of energy and mineral resources, foster sound use of land and water resources, and conserve and protect fish and wildlife. The work that we do affects the lives of millions of people, from the family taking a vacation in one of our national parks to the children studying in one of our Indian schools.

Addressing Public Safety Communications Interoperability and Federal Partnerships

When local, tribal, state, and federal agencies need to work together, whether to put out a fire, find a lost child, protect our borders, or ensure the public stays safe, they must communicate. This is easy enough if you're looking each other in the face, but not so easy if you are each using radio systems in different parts of the radio frequency spectrum (think AM versus FM radio), or using systems which operate differently, even though in the same radio spectrum (think of having an analog TV and not being able to watch digital shows). These are what we term "disparate" systems. The most common form of public safety radio communications uses Land Mobile Radio (LMR) systems.

The ability to find a solution, or set of solutions, to allow disparate LMR systems to work together, or combine these systems, or other concepts so communication can take place, or interoperate, is called "interoperability".

Local, tribal, state and federal public safety agencies, desiring to work together (cooperate), have always had to find ways to interoperate. To achieve adequate communications, processes, procedures and protocols, whether formal or by "handshake" had to be agreed upon amongst all of the cooperators. These interoperability agreements covered a multitude of solutions, including swapping radios, providing radios from one central system to all concerned, agreeing to use each other's radio frequency spectrum and, other solutions. These agreements, when properly practiced, allowed for disparate users of the radio frequency spectrum to interoperate.

Interoperability is not a new idea. The need and capabilities for public safety organizations to work and communicate together has been around since well before the Oklahoma City Bombing, 9/11, and Katrina. The DOI has been using radio systems to communicate with state, local, tribal and other federal agencies to support pubic safety missions for decades.

Harkening back to the early 1970's the Boise Interagency Fire Center, established by the

DOI and the U. S. Department of Agriculture, provided wildland fire fighting communications capability through use of radio systems deployed on wildland fire fighting missions. The use of a single set of systems for all fire fighters on a fire provided needed communications as required, thereby achieving "interoperability." Now known as the National Interagency Fire Center (NIFC), with responsibilities for providing radio communications capabilities, for not only fire fighting efforts, but also natural and man-made disasters, NIFC continues to provide one of the foremost proven tactical, but temporary, solutions.

Radio communications has come a long way since the day when law enforcement officer, fire fighters and emergency medical services only had analog voice as their form of communicating. Today communications technologies can provide voice, data, video, paging, internet access, and a multitude of other capabilities. Many of these capabilities are only usable by one type of system, and therefore are "proprietary". Though very beneficial to the user, proprietary systems have basically only two interoperability solutions. Either everyone uses the same manufacturer's equipment, or other manufacturers must provide software or hardware add-ons to their equipment, which will allow access to the proprietary system. The use of proprietary systems narrows interoperability opportunities, and forces users to a specific type of system, and negates outside cooperators from participating.

The Association of Public Safety Communications Officials (APCO) Project 25, Telecommunications Industry Association (TIA) standard 102, provides for a set of non-proprietary standards for radio communications. This standard, normally called "P25" though based in a narrowband digital format, requires backwards capabilities to communicate with narrowband and wideband analog radios. Wideband defines the amount of the radio frequency spectrum used on a single channel by a radio, and is greater than 12 ½ kilohertz. These channels are set up every 25 kilohertz throughout a range of frequency spectrum, normally called a band. Narrowband channels use less than 12 ½ kilohertz of radio frequency spectrum. The channels can now be spaced every 12 ½ kilohertz, basically doubling the amount of available channels. This is called spectral efficiency. DOI LMR operations have been mandated to use P25 equipment since 1996.

The DOI, along with all other federal agencies, has been congressionally mandated since 1995 to achieve spectral efficiency through narrowbanding our use of the federal LMR spectrum. Federal agencies, for the most part, use the radio frequency band 162 – 174 megahertz, which is considered to be the Very High Frequency (VHF) spectrum range. This portion of the spectrum is under the management of the National Telecommunications and Information Administration (NTIA) and is predominantly for federal use only. State, Local, and many Tribal entities use the 150 – 162 megahertz band for their LMR operations. This portion of the spectrum is managed by the Federal Communications Commission (FCC) is predominantly for use by non-federal entities.

Until recently, non-federal users have not been authorized to use the federal spectrum unless to support all-risk-management actions such as sponsored by NIFC or on a case by case basis for mutual aide. Federal entities, needing access to non-federal cooperators radio systems, are required to register their use with the NTIA in the form of a radio frequency assignment (RFA) and have successful coordination comments from the FCC. DOI maintains almost 1400 of these RFAs and associated agreements due to the missions of the department and our need to consistently work with our state, local and tribal partners.

What are the DOI needs to achieve interoperability?

- DOI, managing one out of five acres in the United States, requires us to interoperate with a huge amount of state, local, tribal and federal public safety agencies. We share too many common missions to operate separately at all times.
- Federal and FCC LMR users have been mandated to achieve spectral efficiency through narrowbanding and we continue to update our stand-alone systems to meet his narrowband mandate.
- An open, non-proprietary standard must be used which will allow various wideband and narrowband analog and digital users to "interoperate."
- We need interoperability solutions to meet public safety missions.

DOI has formulated a strategic vision, which incorporates a paradigm shift in how interoperability can be achieved, to answer the above needs. Instead of maintaining separate, side-by-side systems with state, local, tribal and other federal agency LMR systems, our preferred method is to merge our LMR networks with other large area, state or regional, LMR networks. In order to achieve this integration, DOI's paradigm shift is in providing access to DOI allotted federal radio frequency channels to FCC systems. Additionally, to increase availability of access to DOI managed lands, of course following Environmental Protection Agency cultural protection and other guidance, provide, where capable, additional technical assistance with system maintenance and growth, and provide local DOI personnel to state and regional committees, such as State Executive Interoperability Committees (SIEC).

The shift to inclusion of federal frequencies in state public safety systems is still an on-going process. It is anticipated NTIA and FCC will have further insights, requirements and protocols as this process matures. Currently, the DOI allotments in use in IM are on a temporary assignment basis until NTIA finishes certifying, through the Spectrum Planning Subcommittee process, federal spectrum participation. There is every reason for federal caution to ensure proper safeguards are in-place and followed to protect incursive, non-federal use of the NTIA managed spectrum. Though NTIA fully supports various interoperability solutions, and is amenable to the paradigm shift of using federal frequencies in a non-federal system, we must ensure this does not signal carte blanche access to private sector, commercial and other non-federal users.

DOI has specific requirements in this paradigm shift in our interoperability efforts:

- A signed Memorandum of Understanding (MOU) (or Agreement) (MOA) between the State and DOI. The agreement will be signed at a sufficiently high enough political or managerial level to ensure all participants are duly represented. DOI will sign at the Office of the Secretary National Level.
- The LMR system must adhere to the P25 standard.
- The system must allow end-to-end encryption for the use of the National Institute of Standards and Technology (NIST) Advanced Encryption System (AES) technology.
- In order to be able to provide access to DOI allotments in the federal radio frequency spectrum, the system must be capable of working in either the 162 – 174 megahertz or 406 – 420 megahertz ranges. DOI employees must be active participants in the system. We will not provide radio frequency access if DOI is not an active participant.
- System radio coverages must be at a minimum equivalent to, or preferred, improved over current DOI coverages.
- System redundancy, allowing for ade-

quate radio coverage in case of specific site loss, system recoverability in a timely manner, and resiliency during increased disaster efforts.

Additionally the following have been determined to be best practices:

- Use of trunking technology
- 24/7 public safety dispatch. This can be provided either by the system owner (state or regional), DOI, or combined
- Technical or project director committees where system configurations and technologies can be reviewed and changed to meet system needs. DOI should be a participant with these committees.
- If DOI provides spectrum access, which has been deemed to have considerable value and consistent increasing worth, DOI will not be charged system user fees.

Applicability to Interoperability Montana (IM) and the State of Montana

On October 6, 2006, W. Hord Tipton, DOI Chief Information Officer (CIO); Dick Clark, State of Montana CIO, ITSD- DOA; and Lewis and Clark County Sheriff Cheryl Liedle, representing the Interoperability Montana (IM) Project Directors, signed an agreement for DOI to join their P25 VHF Trunked Public Safety LMR system. This provides an overarching agreement to all DOI agencies and allows them to work with state, local. Tribal and federal agencies operating in Montana, knowing the departmental leadership supports and encourages their efforts.

Though IM is still being built, the basis of the system meets DOI requirements, and exemplifies the type of interoperability solution which meets not only DOI, but local,, tribal, state and federal interoperability needs.

DOI has been a partner in Montana public safety for decades, but until the signing of the agreement, and the gradual migration of DOI missions to IM, all concerned continued to maintain their side-by-side LMR systems, with the use of dozens of local MOUs to reflect our working relationships.

This cooperative partnership meets and exceeds the stated interoperability needs stated above:

- It provides for interoperable LMR communications with Montana state, local and tribal agencies
- Using narrowband technologies, the system achieves mandated spectral efficiency
- Using P25 technologies ensures the system has an open architecture and is non-proprietary, allowing interoperability with analog wideband and narrowband user.

  This is an impressive interoperability solution

DOI is very pleased with our partnership with Montana. The IM, as it matures, will meet or exceed DOI interoperability requirements, while at the same time allowing DOI to migrate from the majority of our own LMR networks. The final outcome allows unimpaired voice and data communications with our cooperative partners, and also saves the taxpayer significant amounts of money to maintain non-interoperable networks. We see our partnership with IM, and in fact with many other states, as a significant and realistic solution to public safety interoperability needs. The ability for state, local, tribal and federal public safety entities to communicate is imperative and driven from the highest levels in government, and more importantly, from the needs of and for, the public.

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